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59TH MEDICAL WING (AETC)
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22 MAY 2017

MEMORANDUM FOR ST
ATTN: JASON RALL

FROM: 59 MDW/SGVU

SUBJECT: Professional Presentation Approval

1. Your paper, entitled **Selective Aortic Arch Perfusion Following Arrest in Swine: Need for Added Oxygen** presented at/published to **2017 Shock Symposium, Ft. Lauderdale, FL, 4-8 June 2017** in accordance with MDWI 41-108, has been approved and assigned local file #**17243**.
2. Pertinent biographic information (name of author(s), title, etc.) has been entered into our computer file. Please advise us (by phone or mail) that your presentation was given. At that time, we will need the date (month, day and year) along with the location of your presentation. It is important to update this information so that we can provide quality support for you, your department, and the Medical Center commander. This information is used to document the scholarly activities of our professional staff and students, which is an essential component of Wilford Hall Ambulatory Surgical Center (WHASC) internship and residency programs.
3. Please know that if you are a Graduate Health Sciences Education student and your department has told you they cannot fund your publication, the 59th Clinical Research Division may pay for your basic journal publishing charges (to include costs for tables and black and white photos). We cannot pay for reprints. If you are a 59 MDW staff member, we can forward your request for funds to the designated Wing POC at the Chief Scientist's Office, Ms. Alice Houy, office phone: 210-292-8029; email address: alice.houy.civ@mail.mil.
4. Congratulations, and thank you for your efforts and time. Your contributions are vital to the medical mission. We look forward to assisting you in your future publication/presentation efforts.

Linda Steel-Goodwin

LINDA STEEL-GOODWIN, Col, USAF, BSC
Director, Clinical Investigations & Research Support

PROCESSING OF PROFESSIONAL MEDICAL RESEARCH/TECHNICAL PUBLICATIONS/PRESENTATIONS

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a. Primary/Corresponding Author Rall, Jason M	CTR	USAF 59th MDW/ST	
b. Hata, Kai W	O-3	Vascular Surgery	
c. Cox, Jennifer M	CTR	USAF 59th MDW/ST	
d. Manning, James E	n/a	n/a	University of North Carolina
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Selective Aortic Arch Perfusion Following Arrest in Swine: Need for Added Oxygen?

Jason M Rall, PhD¹; Kai W Hata, MD²; Jennifer M Cox, BS¹; James E Manning, MD³

¹Office of the Chief Scientist, Wilford Hall Ambulatory Surgical Center, 59th Medical Wing, JBSA-Lackland, TX; ²Division of Vascular Surgery, San Antonio Military Medical Center, JBSA-Ft. Sam Houston, TX; ³Department of Emergency Medicine, University of North Carolina at Chapel Hill, Chapel Hill, NC



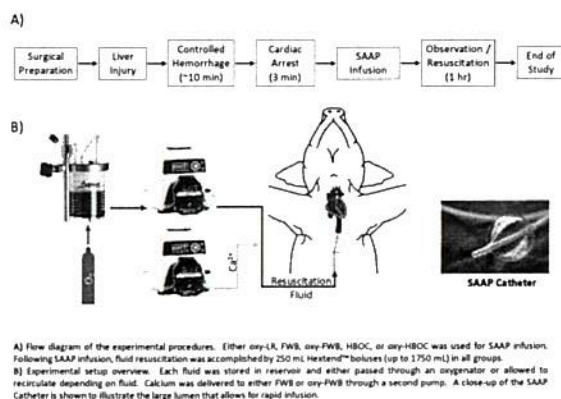
Introduction

Traumatic exsanguination cardiac arrest is largely untreatable using current therapies, including cardiopulmonary resuscitation. One potential therapy, selective aortic arch perfusion (SAAP), restores cardiac function in the laboratory setting. SAAP involves the introduction of an endovascular balloon with a large lumen which allows for rapid infusion resuscitation fluids directly into the aortic arch, and thereby the coronary arteries. However, examination into the role exogenous oxygen plays in a resuscitation fluid's ability to achieve a return of spontaneous circulation (ROSC) and short term survival has yet to be performed. To address this question, we hypothesized that oxygenated blood and oxygen-carrying fluids would have a survival advantage over non-oxygenated resuscitation fluids.

Materials and Methods

Yorkshire swine (70-90 kgs) were anesthetized, instrumented, and their spleen removed. Traumatic exsanguination cardiac arrest was induced through laparoscopic liver injury, followed by controlled hemorrhage to reach a persistent systolic blood pressure of less than 10 mmHg. This arrested state was sustained for three minutes before resuscitation fluids were delivered through the SAAP catheter. The following resuscitation fluids were compared: fresh whole blood (FWB), oxygenated whole blood (oxy-FWB), Hemopure (a hemoglobin-based oxygen carrier, HBOC), oxygenated Hemopure (oxy-HBOC), and oxygenated lactated Ringers solution (oxy-LR).

Figure 1. Experimental overview



Results

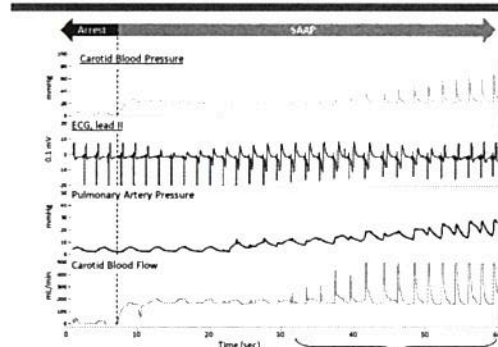


Figure 1. Representative vital signs trace (60 seconds). Dotted line denotes the start of SAAP infusion after three minutes of arrest. ROSC = Return of spontaneous circulation

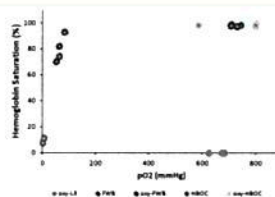


Figure 2. Resuscitation Fluids
Partial pressure of oxygen and percent of hemoglobin bound to oxygen. Fluids were tested from reservoir prior to injury.

Table 1. Resuscitation Fluids

ROSC = Return of Spontaneous Circulation, defined as a systolic blood pressure > 90 mmHg. Vfib = Ventricular fibrillations occurring after SAAP. Defibrillation was not part of this protocol. Data is presented as number of animals in each category (percent).

	ROSC	No ROSC	Vfib	total
oxy-LR	2 (50%)	1 (25%)	1 (25%)	4
FWB	2 (29%)	1 (14%)	4 (57%)	7
oxy-FWB	3 (75%)	0 (0%)	1 (25%)	4
HBOC	3 (75%)	0 (0%)	1 (25%)	4
oxy-HBOC	4 (66%)	0 (0%)	2 (33%)	6
total	14	2	9	25

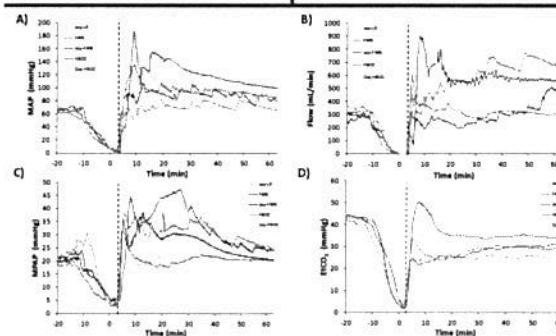


Figure 3. Hemodynamic Parameters A) Carotid Mean Arterial Pressure (MAP) B) Carotid Flow C) Mean Pulmonary Artery Pressure (MPAP) D) End tidal CO2 (EtCO2). Dashed line represents beginning of SAAP infusion.

Results (cont)

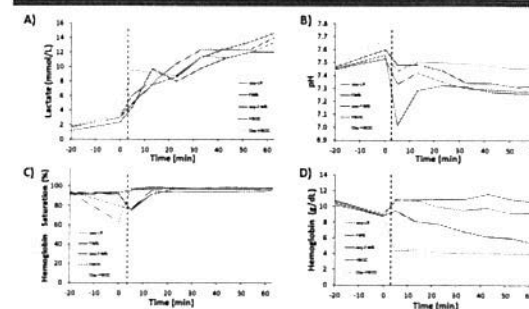


Figure 3. Arterial Blood Gas values A) Lactic acid level B) pH C) Hemoglobin saturation levels D) Hemoglobin concentration. Dashed line represents beginning of SAAP infusion. Blood was sampled from carotid artery except for T₀ which was sampled from the SAAP catheter.

Conclusion

The results presented here show:

- SAAP is an effective therapy to treat traumatic cardiac arrest
- Exogenous oxygenation of resuscitation fluids is not necessary to produce a ROSC after cardiac arrest
- Efficacy of added oxygen compared to no exogenous oxygen is unresolved
- Occurrence of ventricular fibrillations is a potential problem following SAAP intervention
- No significant lesions observed in brainstem, cerebrum, or cerebellum in surviving animals

References

1. Jefferich DR, Gallegos JJ, Jesty SA, Coan PN, Chen J, Heidel RE, Daley BJ. Utility of CPR in hemorrhagic shock, a dog model. *J Trauma Acute Care Surg.* 2016;81(1):27-33.
2. Sherrin PB, Reid C, Habig K, Burns BJ. Algorithm for the resuscitation of traumatic cardiac arrest patients in a physician-staffed helicopter emergency medical service. *Crit Care.* 2013;17(2):308.
3. Manning JE, Murphy CA, Hertz CM, Perretta SG, Mueller RA, Norfleet EA. Selective aortic arch perfusion during cardiac arrest: a new resuscitation technique. *Ann Emerg Med.* 1992 Sep;21(9):1058-65.
4. Manning JE, Ross JD, McCurdy SL, True NA. Aortic Hemostasis and Resuscitation: Preliminary Experiments Using Selective Aortic Arch Perfusion With Oxygenated Blood and Intra-aortic Calcium Co-administration in a Model of Hemorrhage-Induced Traumatic Cardiac Arrest. *Acad Emerg Med.* 2016 Feb;23(2):208-12.
5. Ross JD, Burns CJ, Sagini EM, Zarzabal L-A, Morrison JJ. A laparoscopic swine model of noncompressible torso hemorrhage. *J Trauma Acute Care Surg.* 2014 Sep;77(3 Suppl 2):S77-82.

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Disclaimer

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